# TECHNICAL REVIEW DOCUMENT for OPERATING PERMIT 950PAR037

to be issued to:

Colorado Interstate Gas Company Latigo Compressor Station Arapahoe County Source ID 0050055

Prepared on December 30, 1996
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Revised by Jacqueline Joyce, Review Engineer
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Revised May 18, 1998 and June 3, 1998 due to comments received during the Public Comment Period and Resolution of Public Hearing Issues

#### I. Purpose:

This document establishes the basis for decisions made regarding the Applicable Requirements, Emission Factors, Monitoring Plan and Compliance Status of Emission Units covered within the Operating Permit proposed for this site. It is designed for reference during review of the proposed permit by the EPA, the Public and other interested parties. The conclusions made in this report are based on information provided in the original Title V application submittal of February 1, 1995, a supplemental technical submittal on June 22, 1995, comments on the draft permit submitted on March 5, 1997, an additional information submittal on May 22, 1997, comments received during the Public Comment Period (12/19/97) and correspondance dated April 28, 1998 and May 26, 1998 regarding the resolution of potential Public Hearing issues as well as numerous phone contacts with the applicant. This narrative is intended only as an adjunct for the reviewer and has no legal standing.

On April 16, 1998 the Colorado Air Quality Control Commission (AQCC) directed the Division to implement new procedures regarding the use of short term emission and production/throughput limits on Construction Permits. These procedures are being directly implemented in all Operating Permits that had not started their Public Comment period as of April 16, 1998. All short term emission and production/throughput limits that appeared in the Construction Permits associated with this facility that are not required by a specific State or Federal standard or by the above referenced Division procedures have been deleted and all annual emission and production/throughput limits converted to a rolling 12 month total. Note that, if applicable, appropriate modeling to demonstrate compliance with the National Ambient Air Quality Standards was conducted as part of the Construction Permit processing procedures. If required by this permit, portable monitoring results

and/or EPA reference test method results will be multiplied by 8760 hours for comparison to annual emission limits unless there is a specific condition in the permit restricting hours of operation.

Any revisions made to the underlying construction permits associated with this facility made in conjuntion with the processing of this operating permit application have been reviewed in accordance with the requirements of Regulation No. 3, Part B, Construction Permits, and have been found to meet all applicable substantive and procedural requirements. This operating permit incorporates and shall be considered to be a combined contruction/operating permit for any such revision, and the permittee shall be allowed to operate under the revised conditions upon issuance of this operating permit without applying for a revision to this permit or for an additional or revised construction permit.

# II. Source Description:

This source is classified as a natural gas processing and storage facility defined under Standard Industrial Classification 1321. Natural gas is compressed and stored in wells during an injection phase. Compression is driven using natural gasfired reciprocating engines to power the compressor units. As needed, gas is withdrawn from the storage wells and processed in several stages to separate liquid, gas and hydrocarbon phases. Hydrocarbon liquids are separated with the use of a refrigeration compressor powered by another reciprocating engine. Hydrocarbon liquids collected at each processing stage are stored and then sold for further refining. Water is removed from the gas stream with the use of an ethylene glycol dehydration system. Gas is compressed, if necessary, and transmitted to sales pipelines.

The facility is located approximately 7.5 miles southeast of the Town of Byers, CO in an area designated as attainment for all criteria pollutants. The source has the potential to emit greater than 250 tons per year of Nitrogen Oxides and Carbon Monoxide. Future modifications at the facility which trigger Prevention of Significant Deterioration (PSD) significance levels as defined in Colorado Regulation 3, Part A, Section I.B.57 will require analysis of Best Available Control Technology (BACT) for the Unit(s) in question. Existing site equipment was installed prior to August 7, 1980, the effective date for the current Federal PSD program, and are not subject to these regulations. Facility wide emissions are as follows:

<u>Pollutant</u>	Potential to Emit (tpy)	Actual (tpy)
NO <sub>x</sub>	480	98.66
VOĈ	101	39.3
CO	413	68.7
HAPs	18	6.3

Potential to emit is based on maximum design data supplied with the Title V application assuming 8760 hours per year operation for each piece of equipment

regulated under the Operating Permit. Actual emissions are based on compliance data submitted with the application for the 1994 data year, using actual fuel use and processing values.

At this time, the source has not determined whether this facility is subject to 112(r), the Accidental Release Requirements; however, they have indicated that should they determine that this facility is subject to the requirements they will comply with the requirements within the timeframe specified by the regulation (40 CFR Part 68.10(a)). Based on the information provided in the application, the Division believes that this facility may not be subject to the requirements of 112(r) due to the proposed revisions (April 15, 1996) to the List of Regulated Substances. On June 20, 1996 EPA issued a "stay of effectiveness" regarding the April 15, 1996 proposed revisions to the List of Regulated Substances which allows a source that is affected by the proposed revisions to consider themselves not subject to Part 68 (112(r)) requirements until EPA determines whether to proceed with the revisions to the List of Regulated Substances. This stay is effective for 18 months. For this reason the Division has identified this facility as not subject to the requirements of 112(r) in the draft Operating Permit. The Division is requesting that the source make a definitive 112(r) determination during the Public Comment period. If this determination is not made the Division will assume that the source agrees with the Division's determination that this facility is not subject to the 112(r) requirements.

Colorado Interstate Gas Company certified that the Latigo facility was operating in compliance with all applicable requirements at the time of Title V application submittal.

#### III. Emission Sources:

The following sources are specifically regulated under terms and conditions of the Operating Permit for this Site:

<u>Units E001-E003</u> - White Superior Model 8GTL-825 4 Cycle Internal Combustion Engines, Site Rated 1069 HP, Serial Nos. 265989, 265999, and 266009. Natural Gas Fired.

#### Discussion:

1. Applicable Requirements- These three engines were installed in 1976 following issuance of Colorado Emission Permit C-10,981 on December 10, 1975. This permit limited emissions of Nitrogen Oxides to 80 tons per year for each engine. As part of the Title V application for this source, CIG requested an increase in this limitation to 103.2 tons per year for each engine. Final Approval permit 10AR981 was issued on February 21, 1997, defining the Applicable Requirements for these engines as follows: Annual and hourly emission limits for Nitrogen Oxides, Carbon Monoxide and Volatile Organic Compounds; annual and hourly fuel use limitations; 20%

Opacity limitation. These requirements have been incorporated into the Operating Permit with the exception of the hourly emission and throughput limits and the annual VOC emission limits. The hourly emission and throughput limits were removed as a result of the Division's new short term emission limit policy (based on the April 16, 1998 Colorado AQCC directive). The annual VOC emission limits were removed since annual emissions for each engine, at 8760 hrs/yr, are less than the APEN de minimis levels. In addition, Final Approval permit 10AR981 indicated an annual fuel consumption limit of 69.1 mmSCF/yr based on the higher heating value of the fuel. As requested in CIG's May 26, 1998 the annual fuel usage limit has been increased to 76.53 mmSCF/yr based on the lower heating value of the fuel. It was brought to the Division's attention that the derivation of the engine heat rate (Btu/hp-hr) is based on the lower heating value of the fuel, as confirmed by the manufacturer. To be consistent with the heating value basis, fuel use limits and emissions may be calculated by using the lower heating value of the fuel.

**2. Emission Factors-** Emissions from these reciprocating engines are produced during the combustion process, and are dependent upon the air to fuel ratio adjustment, specific properties of the natural gas being burned, and engine design specifications. The pollutants of concern are Nitrogen Oxides ( $NO_x$ ), Carbon Monoxide (CO) and Volatile Organic Compounds (VOC). Small quantities of Hazardous Air Pollutants (HAPs) are also emitted when combustion is incomplete. Emission factors used to calculate emissions are from AP-42 Compilation of Air Pollutant Emission Factors Table 3.2-2 (7/93) for four-cycle, rich-burn engines:

<u>Pollutant</u>	Emission Factor	
$NO_{x}$	10.0 grams/bhp-hr	
CO	8.60 "	
VOC	0.14 "	

For compliance purposes, these factors were converted to lb/MMBTU using the Method detailed on the attached calculation sheet - "Emission Factor Conversion, G/HP-HR to LB/MMBTU and LB/MMSCF".

- **3. Monitoring Plan-** The methods of verifying compliance with the stated applicable requirements as listed under Conditions 1.1 to 1.5 of Section II of the Operating Permit are consistent with the Monitoring Grid for Internal Combustion Engines developed by the Division (attached). The shaded portion of the grid denotes the applicable monitoring requirements.
- **4. Compliance Status-** A Permit was obtained for these three engines prior to start-up in 1976. Emission and processing levels for 1994 were well below permitted limits. Colorado Interstate Gas has filed the appropriate Air Pollution Emission Notices for these sources. Therefore, these engines are

currently in compliance with all applicable regulations.

<u>Unit E004</u> - Superior Model 8GTL-825 4-Cycle Internal Combustion Engine, Site Rated 963 HP, Serial No. 273579. Natural Gas Fired.

<u>Units E005, E006</u> - Superior Model 6G510 4-Cycle Internal Combustion Engines, Site Rated 400 HP, Serial Nos. 271549 and 264179. Nat. Gas Fired.

#### Discussion:

- 1. Applicable Requirements- These engines were installed in 1977 and 1978. At that time, Colorado Regulation No. 3 exempted from permitting requirements any gas-fired internal combustion engine site rated at less than 1000 HP. All three of these engines meet this criteria. Therefore, the only Applicable Requirements are a 20% Opacity limitation and filing Air Pollution Emission Notices in accordance with Regulation No. 3, Part A. As stated earlier, the increased emissions associated with installation and operation of these engines did not trigger PSD requirements since the increase occurred prior to August 7, 1980, when the current significant increase triggers went into effect.
- **2. Emission Factors-**The emission factors to be used for calculating annual emissions from these engines for fee purposes are from AP-42, Table 3.2-2 (7/93) for four-cycle, rich-burn engines (same gr/hp-hr factors as listed for E001-E003).
- **3. Monitoring Plan-** Since no emission or fuel use limitations exist for these engines, monitoring requirements are limited to stating the method that will be used to determine annual emissions for fee purposes and insuring compliance with the Opacity standard. The monitoring plan as detailed in Conditions 2.1-2.3 and 3.1-3.3 in Section II of the Operating Permit is consistent with the Monitoring Grid for Internal Combustion Engines developed by the Division (attached). Annual emissions will be based on hours of operation and the maximum site-rated horsepower of the engines.
- **4. Compliance Status-** Colorado Interstate Gas has filed the appropriate APENs for these engines, and have continued to use natural gas as fuel to comply with the Opacity standard. Therefore, these engines are currently in compliance with all Applicable Requirements.

# <u>Unit D001</u> - Olman Heath Model 2205G 60 MMscfd Glycol Dehydration Unit, Serial No. 23596.

#### Discussion:

1. Applicable Requirements- This Unit was installed and began operation at the site in 1977. At that time, the Division did not require quantification of Volatile Organic Compound emissions from these units. Subsequently, only the heater portion of the dehydrator was initially permitted under Colorado Permit C11,392. This permit contained limitations for both particulate and sulfur dioxide emission rates. As part of the Title V application, CIG requested that these limitations be removed since the heater portion of the dehydration unit falls under the insignificant activity category for fuel burning equipment less than 5 MMBTU/hr.

As a result of the APEN submitted with the OP application quantifying VOC and HAP emissions from this dehydrator, Colorado Construction Permit 11AR392 (initial approval, modification No. 1) has been issued limiting Volatile Organic Compound and specific HAP emissions. Since the dehydrator will have been operating for more than 180 days by the due date of the first semi-annual monitoring report required by this permit, the Division considers that the Responsible Official certification submitted with that report will serve as the self-certification for construction permit 11AR392. The permit also limits the amount of gas that can be processed by this dehydrator.

Conditions of permit 11AR932 (initial approval, modification No. 1, dated February 21, 1997) include VOC emissions of 20.3 lbs/hr and 89 tons/yr and emission limits on benzene, ethyl benzene, toluene, n-hexane and ethylene glycol. The highest HAP emission limit was for n-Hexane, which was 31,177 lbs/yr (15.6 tons/yr), and exceeds 10 tons/yr; therefore making this unit a major source for HAPs. CIG's May 22, 1997 response to the Division's request for additional information, indicated that they wanted this unit permitted as a synthetic minor source for HAP emissions. CIG proposed to limit the hours of operation on the unit in order to obtain synthetic minor status for this unit. The May 22, 1997 submittal included a "worst case" GlyCalc run which resulted in significantly lower VOC, as well as HAP emissions. Because this GlyCalc run represents "worst case", the emission limits for VOC will be modified to reflect these operating conditions. The emission limits for HAPs will also be based on the "worst case" GlyCalc run. The applicable requirements for the dehydrator, based on the changes made in response to CIG's May 22, 1997 letter, are as follows:

VOC emissions: 2.1 tons/mo\* and 9 tons/yr
 Individual HAP emissions: 0.45 tons/mo\* and 2 tons/yr\*\*

- Combined HAP emissions: 1.4 tons/mo\* and 6 tons/yr\*\*
- Natural Gas Processing: 140 MMscf/day\* and 17,500 MMscf/yr\*\*\*
- Hours of Operation: 3,000 hrs/yr

\*These short term emission limits have not been included in the Operating Permit as a result of the Division's new short term emission limit policy (based on the April 16, 1998 Colorado AQCC directive).

\*\*Because the EPA has not yet approved the State rules for limiting the potential to emit on HAPs, the source will be required, per Colorado Regulation No. 8, Part E, Section IV.H.2, to submit a written notification to the EPA and the State, upon issuance of the permit, that the source is in compliance with permit conditions and accepts Federal and citizen enforcement of the conditions contained in the permit.

\*\*\*The annual limit for natural gas processing is based on the unit being operated at the rate of 140 MMscf/day for 3000 hours.

These modifications were made directly into the Operating Permit since no additional applicable requirements were triggered and a significant reduction in emissions resulted from the requested changes.

Since CIG has asked for limits on HAP emissions this unit has synthetic minor status for HAPs and as a result the future MACT standard for operations at Oil and Gas facilities is unlikely to apply to this unit.

- 2. Emission Factors- Ethylene glycol is injected into the natural gas stream to prevent the formation of hydrates. Liquid hydrocarbons and the glycol/water mixture are removed from the gas stream in a cold separator. The glycol/water mixture is heated in the still vent portion of the unit which drives off the water and some entrained VOCs. Emissions from this process are typically predicted using the Gas Research Institute's GLYCalc Model. Emission factors of VOCs and various HAPs are dependent upon the variables input into this Model. These variables include glycol recirculation rate, cubic feet of gas processed, cold separator temperature and pressure, and percentage breakdown by volume of constituents in the natural gas.
- **3. Monitoring Plan-** CIG will use the GRI GLYCalc Version 3.0 Model or higher, as necessary, to predict emissions of VOC and HAPs from the still vent of this dehydration unit to determine compliance with VOC and HAP emission limitations. Daily recording of system parameters and semi-annual gas analysis will be conducted as outlined in Condition 4.1 of the Draft Operating to compare to established worst-case parameter values. Hours of Operation, as well as natural gas processed, will be monitored and recorded monthly in order to demonstrate compliance with these limits.

**4. Compliance Status-** CIG submitted an APEN for this dehydrator with the Operating Permit application in accordance with the Division policy of October, 1994 in which VOC and HAP emission data was requested. The appropriate Construction permit was generated as a result. Therefore, this unit is currently in compliance with all Applicable Requirements.

# <u>Unit F001</u> - Fugitive Emissions of VOC from Equipment Leaks

#### Discussion:

1. Applicable Requirements- Fugitive emissions at compressor stations have traditionally not been permitted unless requirements of New Source Performance Standard (NSPS) Subpart KKK apply. In this case, the plant began operation in 1976, with expansions in 1977 and 1978. The Division has interpreted that NSPS KKK will not apply to sources which substantially began operation prior to the effective date of this NSPS (January 20, 1984). However, as part of the Title V process, equipment leak estimates at these sources will be included in the Operating Permit if the state permitting thresholds are exceeded. Emissions as submitted in CIG's permit application exceed the 5 ton per year permitting threshold for Volatile Organic Compounds in ozone attainment areas as defined by Colorado Regulation No. 3. Therefore, the Division issued a construction permit, 95AR109 (initial issue) for fugitive VOC emissions. Since the equipment covered by this permit will have been operating for more than 180 days by the due date of the first semi-annual monitoring required by this permit, the Division considers that the Responsible Official certification submitted with that report will serve as the self-certification for construction permit 95AR109. permit identifies applicable requirements as both hourly and annual emission and natural gas throughput limits; as well as identifying maximum equipment components.

Natural gas throughput limits have not been included in the Draft Operating Permit as throughput is not a factor in determining emissions from equipment leaks. In addition, the Division has not included an hourly emission limit in the permit. The Division has determined that an hourly fugitive VOC emission limit is not enforceable as a practical matter unless conditions are imposed requiring use of leak detection devices on each component. Since this facility is not subject to New Source Performance Standards (NSPS) Subpart KKK no such requirements will be imposed on this facility. Finally, the Division has not included any limits on the number and types of components in order to allow flexibility.

**2. Emission Factors-** The calculated VOC emissions in the Draft Operating Permit are based on EPA's Protocol for Equipment Leak Estimates, Table 2-6 (EPA 453/R-93-026). Factors are multiplied by the number of components of each type (e.g. Compressor Seals) and the VOC weight

percentage in the organic portion of the gas stream as determined in the most recent analysis.

- **3. Monitoring Plan-** CIG will be required to conduct an initial inventory of valves, seals, etc. and track additions and deletions of components at the site during the permit term. Records will be used to determine VOC emissions based on the emission factors listed in the permit. CIG must also outline what steps have been taken to repair or mitigate leaks discovered during the reporting period (See Condition 5.2 of Operating Permit).
- **4. Compliance Status-** CIG accurately quantified emissions of VOC from Equipment Leaks and submitted a representative APEN in the Operating Permit application. They are therefore currently in compliance with state requirements.

# IV. Insignificant Activities

# **Emissions from Purging/Venting during Start-up or Shut-Down**

In response to the technical request, CIG submitted calculations quantifying emissions from the release of natural gas during routine periodic maintenance of the compressor engines. Assuming 2000 cf was vented from each engine once per year, emissions of VOC were determined to be well below reportable de-minimis levels.

# **Well Head Heater Separators**

Under Colorado Regulation No. 3, Part C, Section II.E.3.k, gaseous fuel burning equipment with a design heat rate of less than 5 MMBTU/hr can be considered as an insignificant activity for the Operating Permit. Therefore, these units will not be regulated in the Operating Permit, and are listed in Appendix A as insignificant activities.

# **Emergency Generator**

The emergency generator on site has been identified as meeting the insignificant activity criteria of Regulation No. 3, Part C, Section II.E.nnn.

# V. Alternative Operating Scenarios

### **Temporary Engine Replacement-**

CIG has indicated that replacement engines are typically not used during major engine overhaul. They are aware that any temporary or permanent replacement of engines at this site shall not be conducted without prior notification to the Division. The Division will determine whether the proposed

change at the site will require a Construction Permit and/or modification of the Operating Permit. Installation of equipment not specifically identified in the Permit prior to notification to the Division shall be considered a violation subject to enforcement action.

#### V. Permit Shield

The regulation citations identified as not applicable to this source in Section III of the Operating Permit are based on a condensed version of the requested Permit Shield citations as submitted with the original application for this plant. The original list contained many citations that were clearly unnecessary for the shield. For example, CIG stated that Incinerator regulations would not apply since no equipment on site met the definition of an incinerator. It is the Division's opinion that the Shield should be reserved for regulations that might reasonably otherwise apply to equipment at the plant in question. Therefore, the Division proposes that the Permit Shield be condensed to a format similar to that submitted for CIG's second two-third sources (e.g. Vilas Compressor Station).